PT-55

US Model

PROGRAM TIMER

SPECIFICATIONS

Power requirements	120 V ac, 60 Hz
Power consumption	5 W
Control time	12-hour cycle
Timer setting	One on/off operation
Sleep timer operation	Less than 59 minutes
Clock	Synchronized with power line frequency
Timer accuracy	Less than +0.02 sec. per day excluding time error from fluctuations in power line frequency
AC outlets	2 switched, total 500 watts
Dimensions	Approx. 430 × 55 × 165 mm (w/h/d) (17 × 2¼ × 6¼ inches) incl. projecting parts and controls
Weight	Approx. 1.9 kg (4 lb 3 oz) net Approx. 2.3 kg (5 lb 2 oz) in shipping carton

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

MICROFILM

SONY®

SERVICE MANUAL

SERVICING NOTE

Handling Precautions for MOS ICs

Generally, the insulation resistance of the oxide layer in MOS IC structures is very high, and the oxide layer is very thin. Because of this, it is possible that the static voltages usually present on clothes and the human body will be enough to generate a potential difference across the insulator, high enough to cause a breakdown of the insulating layer.

The following precautions should be taken while handling these ICs.

(Particular care should be taken under conditions of low humidity.)

Precautions in Replacing MOS ICs

1. Store new ICs by inserting them into a urethane-polyester cushion (which is somewhat conductive), or wrapping it in aluminum foil, so that all the pins are at the same potential.
   (The ICs should be stored in that manner until mounted on the circuit board.)

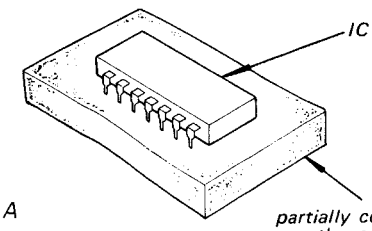


Fig. A

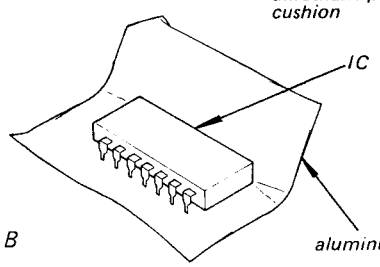


Fig. B

2. Check the soldering iron for possible power-line leakage current. Make sure that there is no leakage path by connecting an ohmmeter to the tip of the soldering iron and the plug as shown in Fig. C. If there is a leakage path, use some other soldering iron.

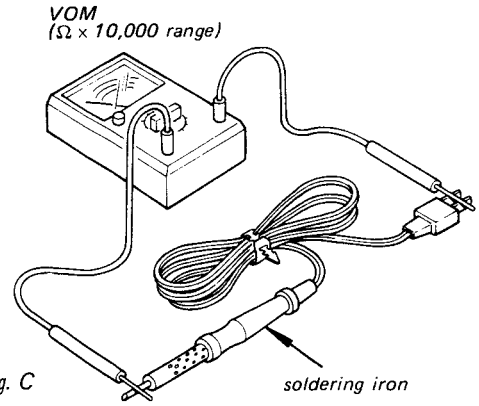


Fig. C

3. Equalize any potential difference between the clothes, the tools in use, the work bench, the set being worked on, and the packaged IC by touching them all in succession with the hands or a conductive wire or tool.
4. The following are effective methods for handling ICs that remove the potential difference across the oxide layer.
   - Use a paper clip modified by soldering in a wire braid insert.

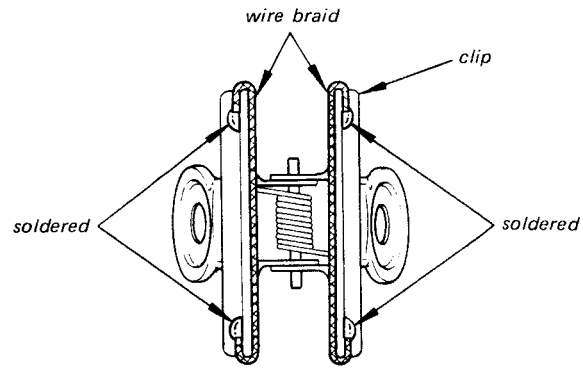


Fig. D Make sure that there is no solder on the inside.

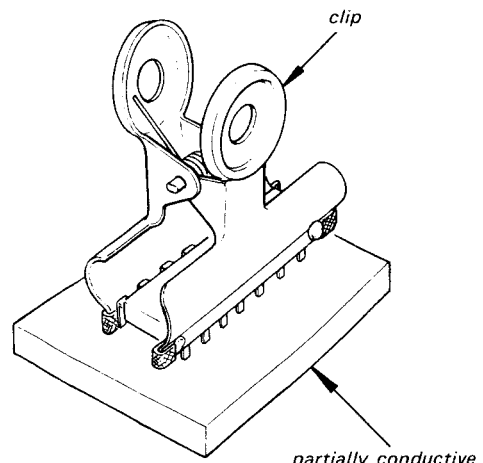


Fig. E

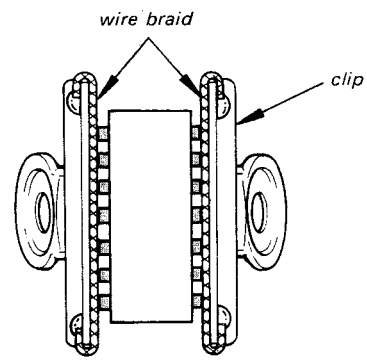


Fig. F Make sure that all the pins are in contact with the wire braid (all the pins will then be at the same potential.).

- Take a short length of fine bare wire and wind it around the IC so that it shorts all the pins of the IC, while it is still in the urethane-polyester cushion or aluminum foil. This ensures that all the pins are at the same potential.

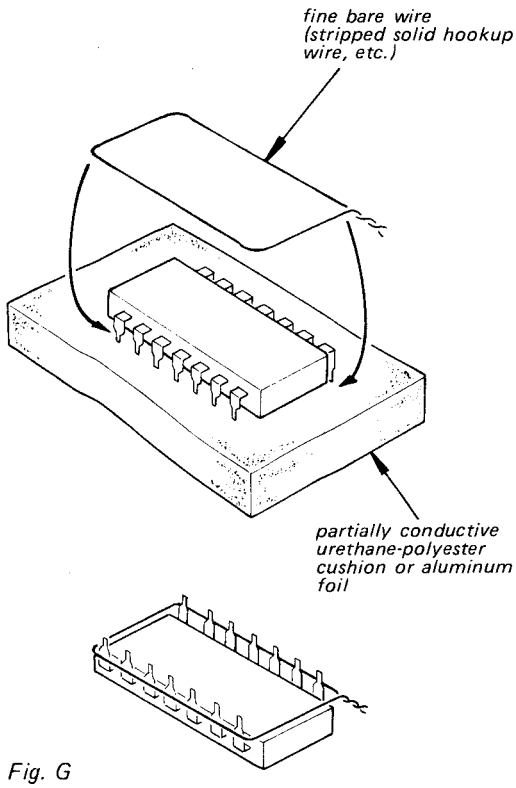


Fig. G

- When it is necessary to handle the IC with the fingers, do not touch any pin, and hold the IC at the ends of its plastic-package case as shown in Fig. H.

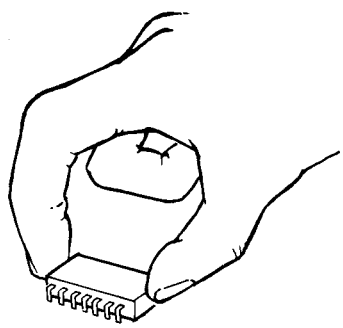


Fig. H

5. Method of Mounting
Insert the IC while holding it with the modified clip, and solder all the pins with the clip still shorting the pins. (Similarly, solder all the pins while the bare shorting wire is still wound around them.). Remove the clip or the bare shorting wire only after all the pins have been soldered.

Precaution while Checking C-MOS ICs

The C-MOS ICs (Complementary MOS) are MOS ICs that have their output sections made up of N-channel and P-channel push-pull stages to increase their speed of operation. If the output terminal of these ICs comes into contact with B+ or B- voltage, then the FET which is ON at that time will either become shorted or open.

This is valid for all the output sections that are connected together by the interconnections. Even the circuits that are physically separated (and not on the same board) can be destroyed simultaneously.

Example:

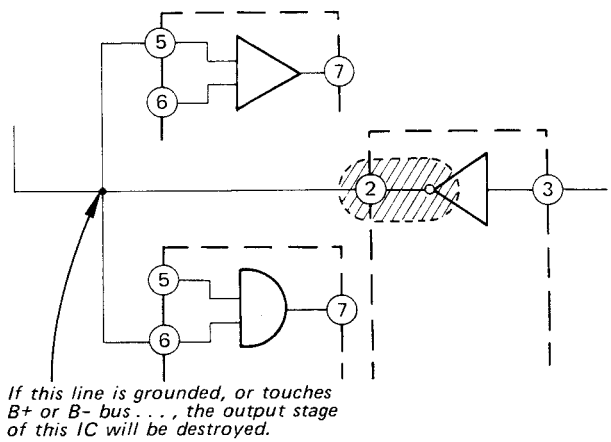
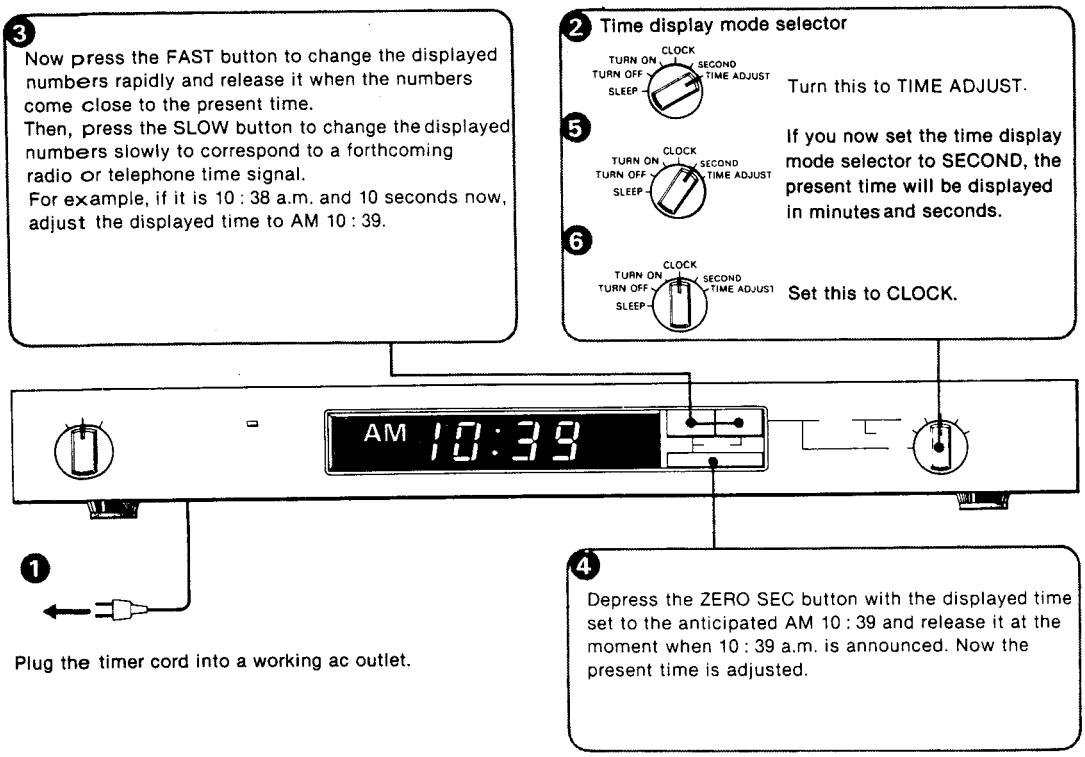


Fig. I

SECTION 1
OUTLINE

CLOCK ADJUSTMENT

Before the timer can be used, it must first be set to the correct time.
Proceed as follows.


3
Now press the FAST button to change the displayed numbers rapidly and release it when the numbers come close to the present time.
Then, press the SLOW button to change the displayed numbers slowly to correspond to a forthcoming radio or telephone time signal.
For example, if it is 10 : 38 a.m. and 10 seconds now, adjust the displayed time to AM 10 : 39.
2 Time display mode selector
CLOCK
TURN ON
TURN OFF
SLEEP
SECOND
TIME ADJUST
Turn this to TIME ADJUST.
5
If you now set the time display mode selector to SECOND, the present time will be displayed in minutes and seconds.
6
Set this to CLOCK.
AM 10:39
1
Plug the timer cord into a working ac outlet.
4
Depress the ZERO SEC button with the displayed time set to the anticipated AM 10 : 39 and release it at the moment when 10 : 39 a.m. is announced. Now the present time is adjusted.

LET'S TEST!

Turn all the connected appliances **on**, and set the timer operation selector as follows :

Set to MANUAL ON. Do all the connected appliances turn on?
Set to MANUAL OFF. Do all the connected appliances turn off?.

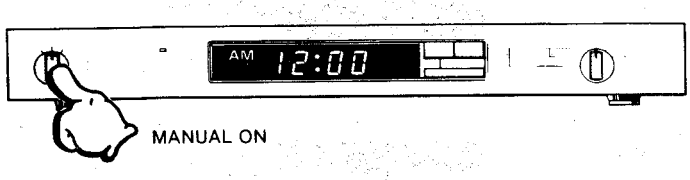
If so, you can now proceed to set the timer.
If not, check that each appliance is plugged in, and that it is turned on.

TIMER SETTING

The ☞ marks in the illustrations show the controls to use.
Set the turn-on and turn-off time as follows.

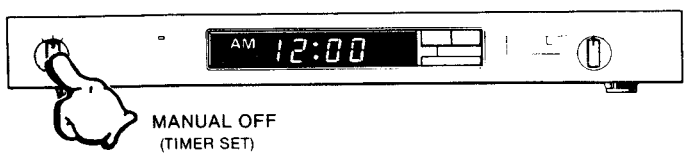
1 SETTING THE TURN-ON TIME

❶ Set the timer operation selector to MANUAL ON.

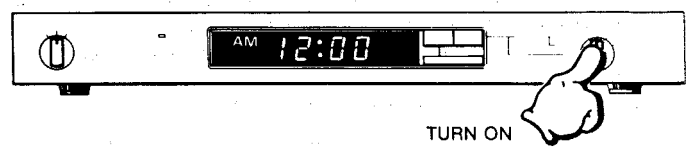


❷ Turn the amplifier, the tuner (or the receiver) and the tape deck on, and make the required preparation for recording or playback.

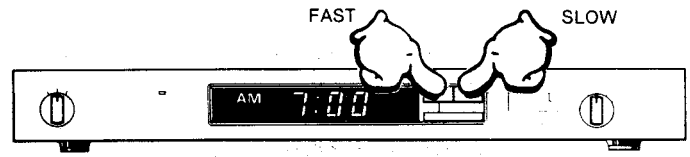
❸ Set the timer operation selector to MANUAL OFF.
(TIMER SET)



❹ Set the time display mode selector to TURN ON.

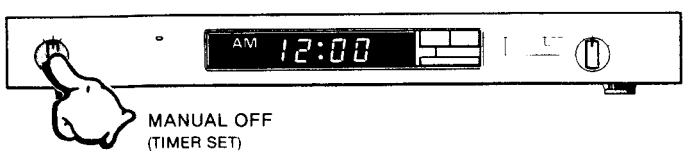


❺ Set the turn-on time to the start time of a broadcast program (or a desired playback time) by pressing the FAST and SLOW buttons as required.

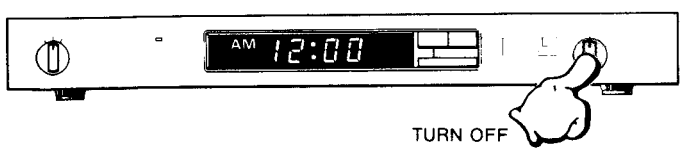


2 SETTING THE TURN-OFF TIME

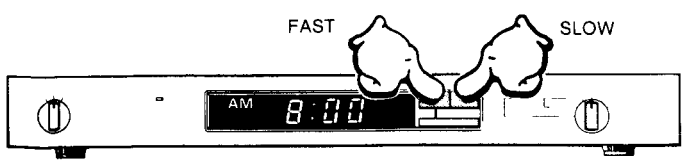
❶ Set the timer operation selector to MANUAL OFF.
(TIMER SET)



❷ Set the time display mode selector to TURN OFF.

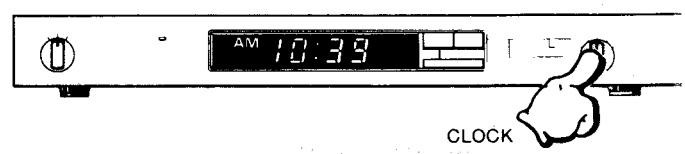


❸ Set the turn-off time to the end time of the broadcast (or playback) program by pressing the FAST and SLOW button.



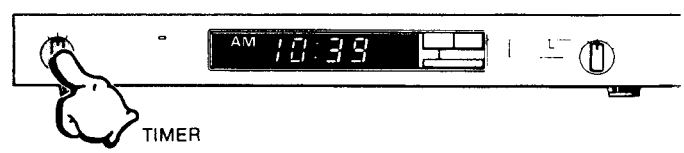
3 TO DISPLAY THE PRESENT TIME AGAIN

Set the time display mode selector to CLOCK.



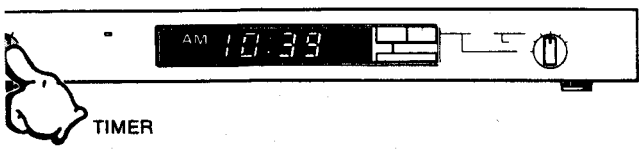
4 THE FINAL STEP OF THE TIMER SETTING PROCEDURE

Set the timer operation selector to TIMER.

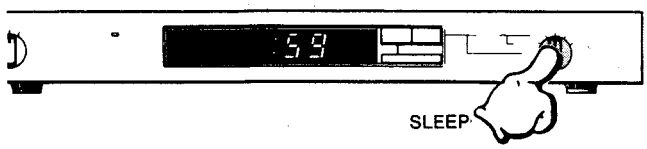


LEEP" TIMER SETTING

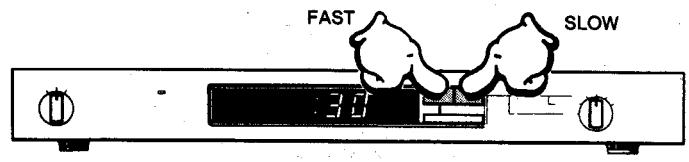
; feature is used to shut off a broadcast or playback program
r a preselected interval of 59 minutes or less.
ır the preset interval, the connected appliances will be turned
automatically.
et the timer operation selector to TIMER.

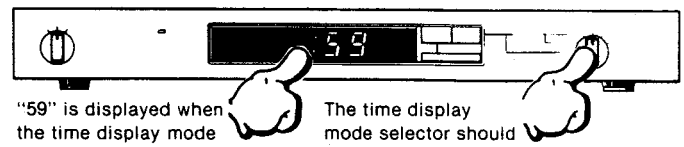


et the time display mode selector to SLEEP, and power is sup-
d to the connected appliances.



❸ Set the desired interval by pressing the FAST and/or SLOW button as required.





"59" is displayed when the time display mode selector is first set to SLEEP, and the number then decreases by pressing the FAST or SLOW button.

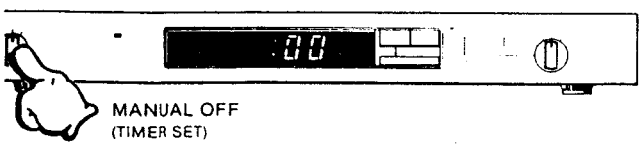
The time display mode selector should then be normally set to CLOCK after the sleep timer setting has been made.

'ECIAL PROCEDURES

TURN THE TIMER INDICATOR OFF.

ən the timer indicator can not be turned off after the timer set-
, set the timer operation selector to MANUAL OFF and then to
ER. (TIMER SET)

TURN THE POWER OFF WHILE SYSTEM IS OPERATING



turning the power of the connected appliances off during the
ər-on time or SLEEP timer operation, set the timer operation
ːctor to MANUAL OFF.
(TIMER SET)
ɔu want to wake up to a radio program by setting the timer-on
ə, set the timer operation selector to TIMER again.

RECORD FROM THE BEGINNING OF A PROGRAM SOURCE

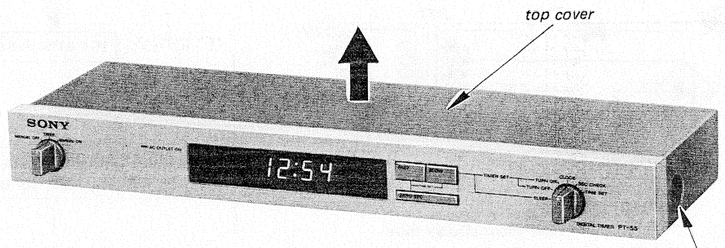
ən the connected appliances are turned on at the selected time,
ay take a little time for them to work normally.
ɔ, the beginning of the program material for a timer activated
ɔrding may not be recorded. Advance the clock about 10
ɔnds as follows to avoid this problem.
eset the present time according to steps 2 and 3 of the "Clock
ıstment" on page 6.
/hen the ZERO SEC button is pressed at step 4, release it about
ːeconds earlier than the 10 : 39 signal.

FOR TURNING THE CASSETTE DECK OFF

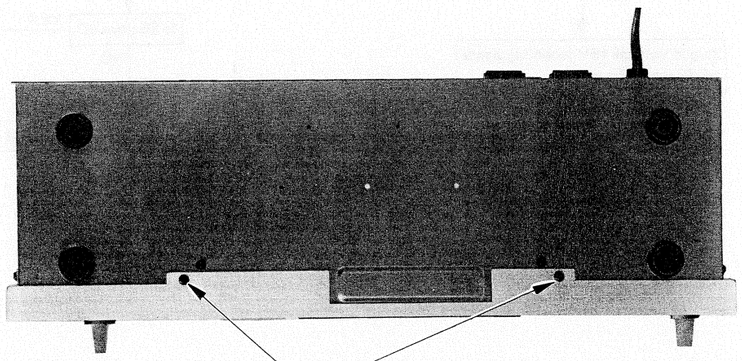
If the timer standby function of your tape deck allows the timer-activated operation to function only once, and it does not turn the tape deck off automatically when the timer cuts off the power, it is important to set the turn-off time of the timer so that the power to the tape deck will be cut off after the automatic shut-off mechanism has disengaged the recorder's operating mode. Avoid setting the timer so that it will shut off power to the cassette deck while it is operating.

SECTION 2
DISASSEMBLY

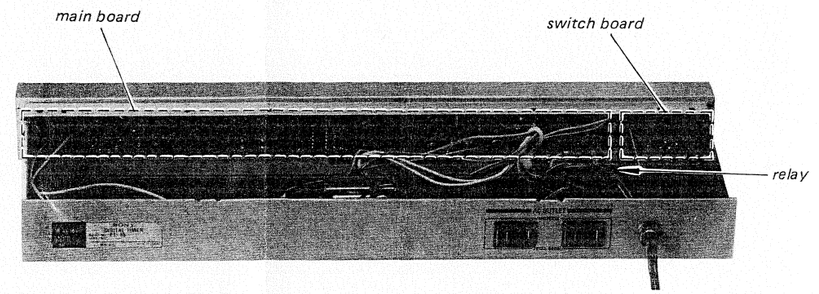
Top Cover

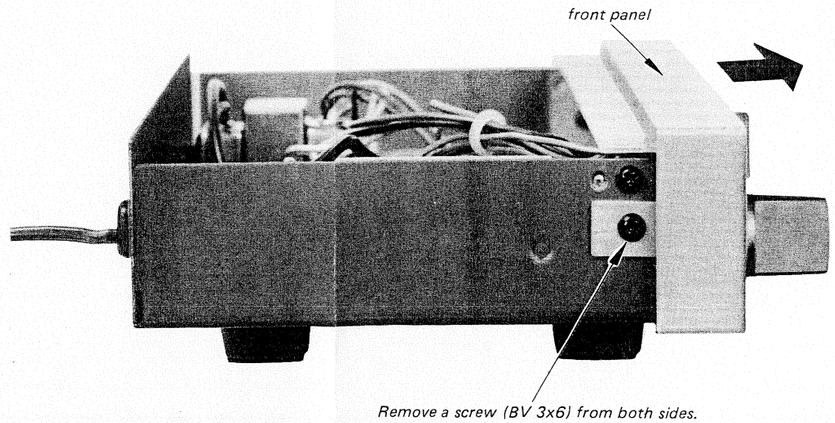


Front Panel



In the following conditions, each board can be checked.



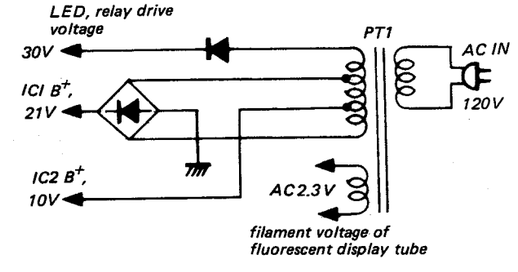


(MEMO)

SECTION 3
TROUBLE SHOOTING CHART

TROUBLE SHOOTING CHART

1. Power Voltage Check



Note: Before starting the following procedures, make sure that power voltage is normal.

2. Display tube turns off.

↓

Is filament voltage 2.3V ac?

YES

↓

Is grid voltage 15V when segments of display tube go on?

YES

↓

Display tube defective

3. Display tube does not indicate correctly, or brightness of all segments reduces.

↓

IC1 defective

4. 0 number does not blink in the display window after power failure.

↓

Is clock present at terminal (46) of IC1?

YES → **R2, C1 defective**

NO → **IC1 defective**

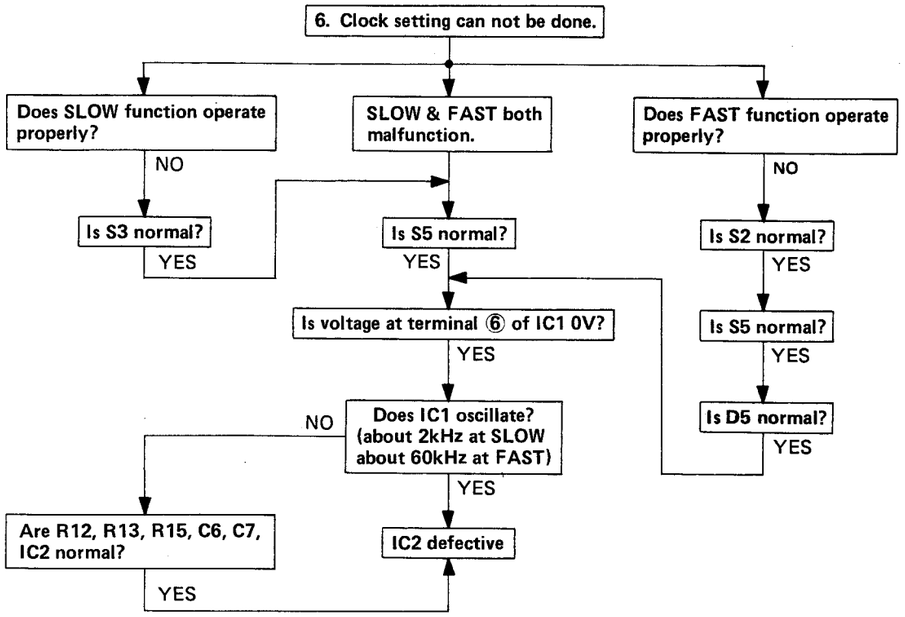
5. Time display mode can not be selected.

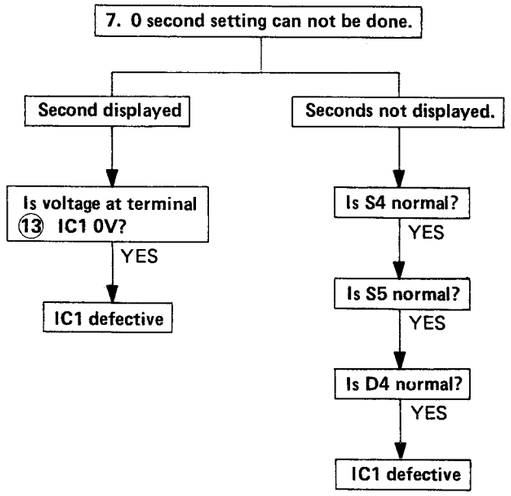
↓

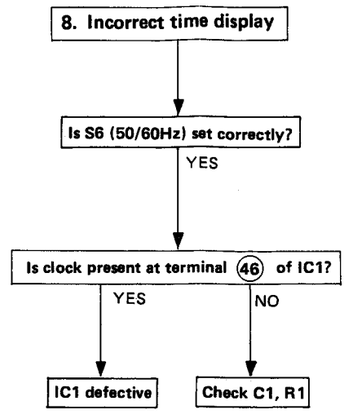
Is S5 normal?

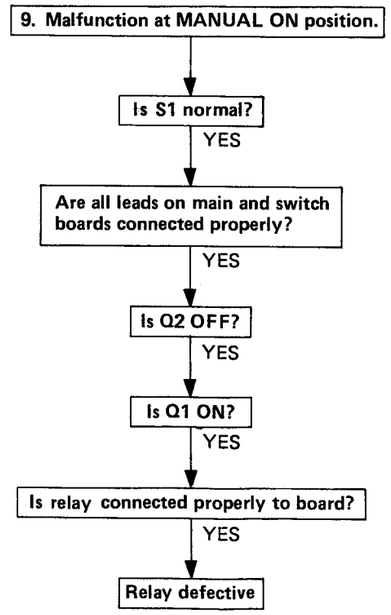
YES → **IC1 defective**

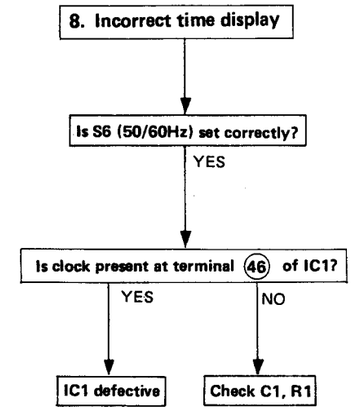
NO → **S5 defective**

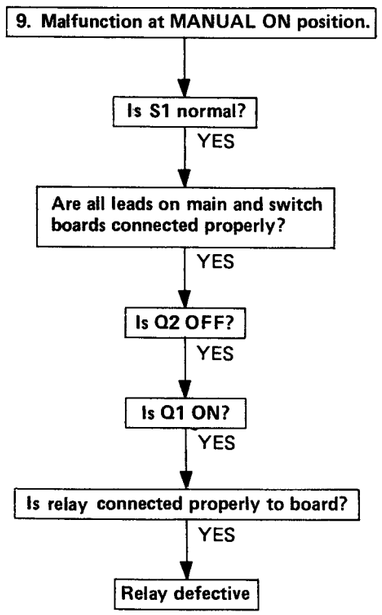

6. Clock setting can not be done.
Does SLOW function operate properly?
NO
Is S3 normal?
YES
SLOW & FAST both malfunction.
Is S5 normal?
YES
Does FAST function operate properly?
NO
Is S2 normal?
YES
Is S5 normal?
YES
Is D5 normal?
YES
Is voltage at terminal ⑥ of IC1 0V?
YES
NO
Does IC1 oscillate? (about 2kHz at SLOW about 60kHz at FAST)
YES
Are R12, R13, R15, C6, C7, IC2 normal?
YES
IC2 defective

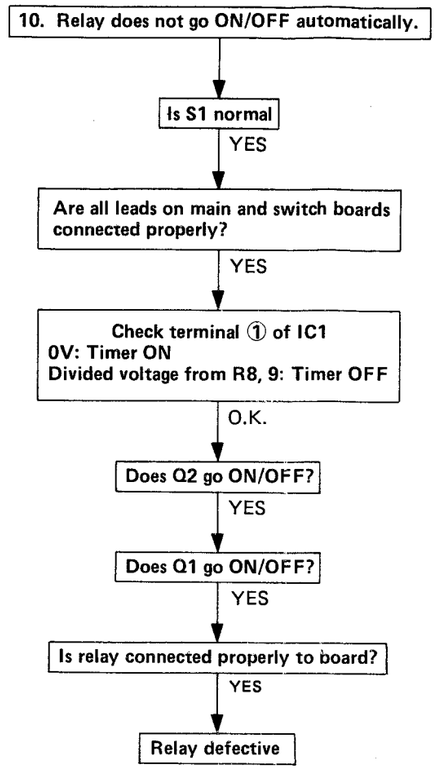

7. 0 second setting can not be done.
Second displayed
Is voltage at terminal ⑬ IC1 0V?
YES
IC1 defective
Seconds not displayed.
Is S4 normal?
YES
Is S5 normal?
YES
Is D4 normal?
YES
IC1 defective

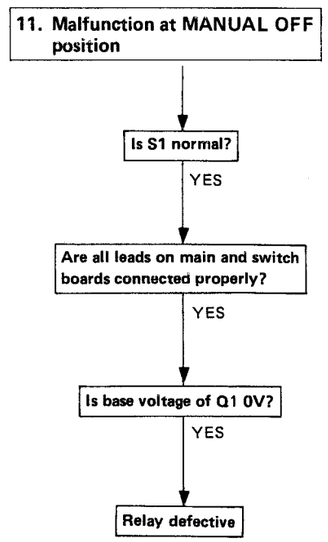

8. Incorrect time display
Is S6 (50/60Hz) set correctly?
YES
Is clock present at terminal (46) of IC1?
YES
NO
IC1 defective
Check C1, R1


9. Malfunction at MANUAL ON position.
Is S1 normal?
YES
Are all leads on main and switch boards connected properly?
YES
Is Q2 OFF?
YES
Is Q1 ON?
YES
Is relay connected properly to board?
YES
Relay defective


8. Incorrect time display
Is S6 (50/60Hz) set correctly?
YES
Is clock present at terminal (46) of IC1?
YES
NO
IC1 defective
Check C1, R1


9. Malfunction at MANUAL ON position.
Is S1 normal?
YES
Are all leads on main and switch boards connected properly?
YES
Is Q2 OFF?
YES
Is Q1 ON?
YES
Is relay connected properly to board?
YES
Relay defective


10. Relay does not go ON/OFF automatically.
Is S1 normal
YES
Are all leads on main and switch boards connected properly?
YES
Check terminal ① of IC1
0V: Timer ON
Divided voltage from R8, 9: Timer OFF
O.K.
Does Q2 go ON/OFF?
YES
Does Q1 go ON/OFF?
YES
Is relay connected properly to board?
YES
Relay defective


11. Malfunction at MANUAL OFF position
Is S1 normal?
YES
Are all leads on main and switch boards connected properly?
YES
Is base voltage of Q1 0V?
YES
Relay defective

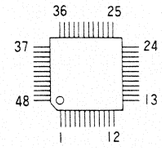
SECTION 4
DIAGRAMS

4-1. MOUNTING DIAGRAM

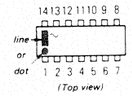
– Conductor Side –

Semiconductors Lead Layouts

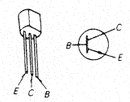
MB8724B



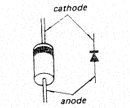
IC4007UBP, MC14007UB



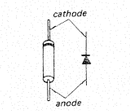
2SC1364, 2SC1815Y



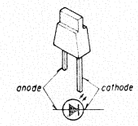
ERB12-04RK, ERB12-04



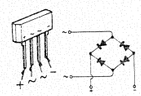
1S1555, 1S1554

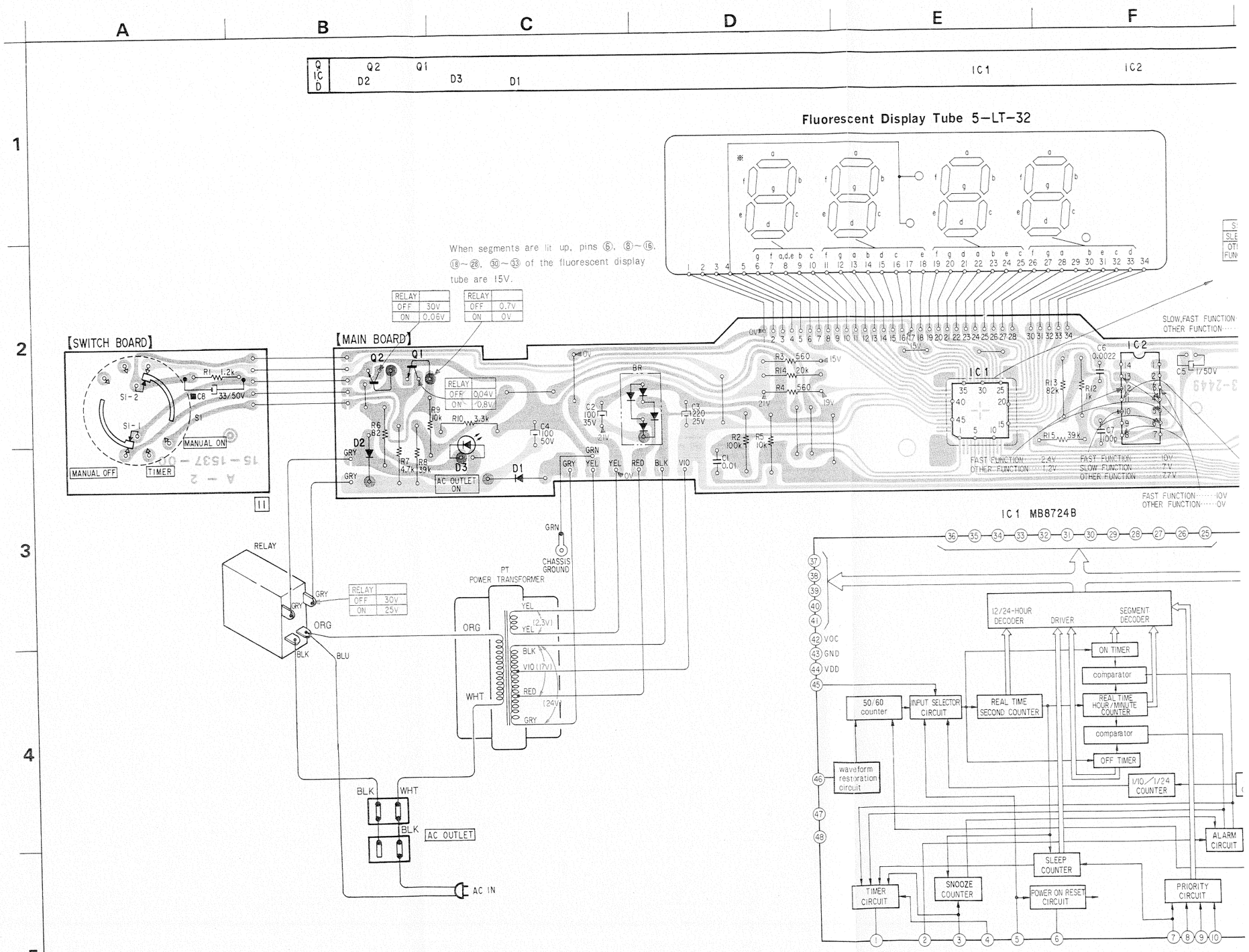


SLP237B



SIRB10, 1D4B41

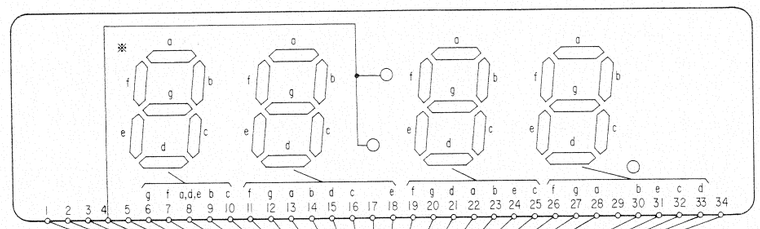




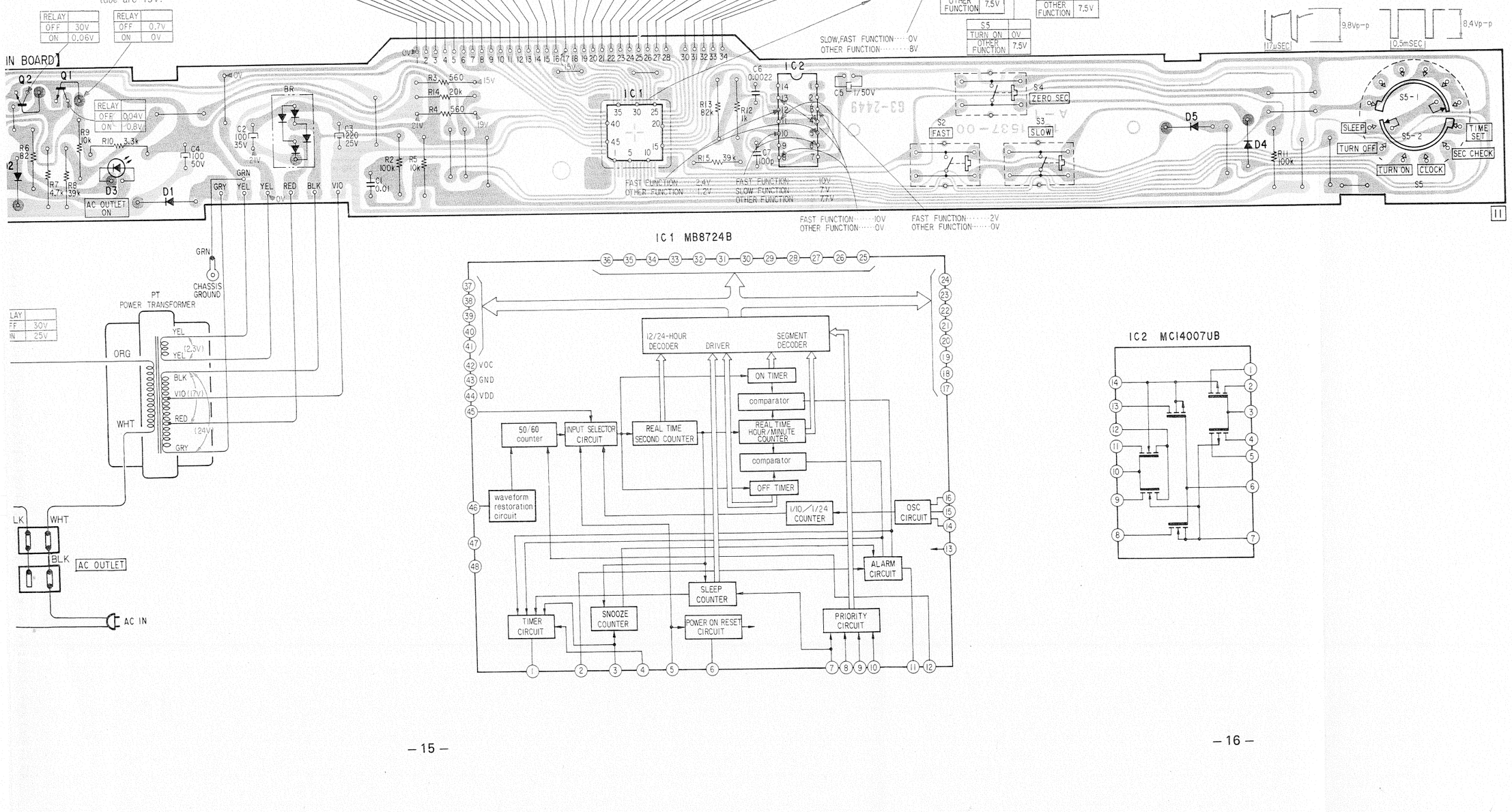
C D E F G H I

Q2 Q1 D2 D3 D1 IC1 IC2 D5 D4 Q IC D

Fluorescent Display Tube 5-LT-32



When segments are lit up, pins ⑥, ⑧~⑯, ⑱~㉘, ㉚~㉝ of the fluorescent display tube are 15V.

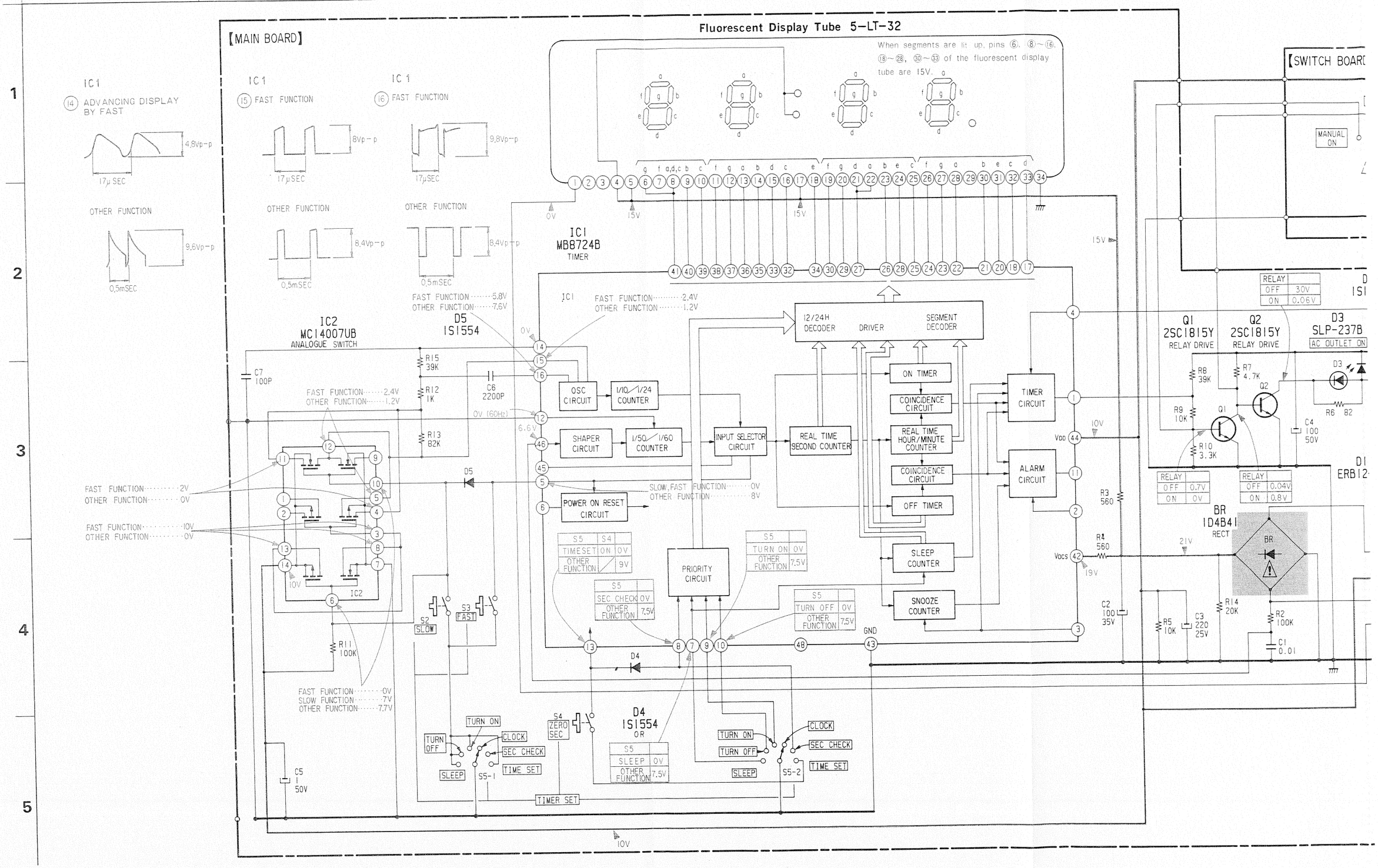


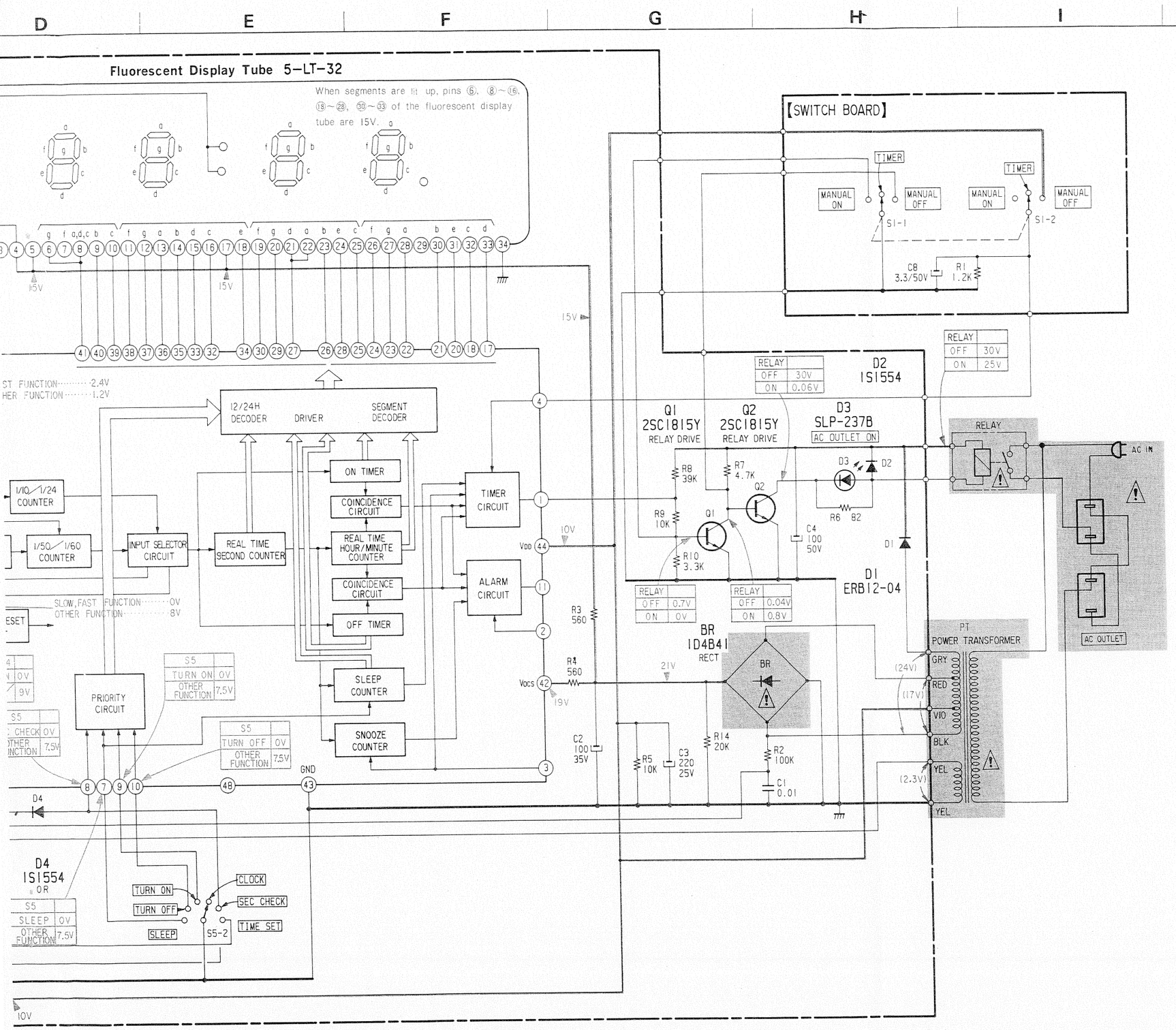
IC1 MB8724B

IC2 MC14007UB

1 2 3 4 5

4-2. SCHEMATIC DIAGRAM





Terminal Table (IC1)

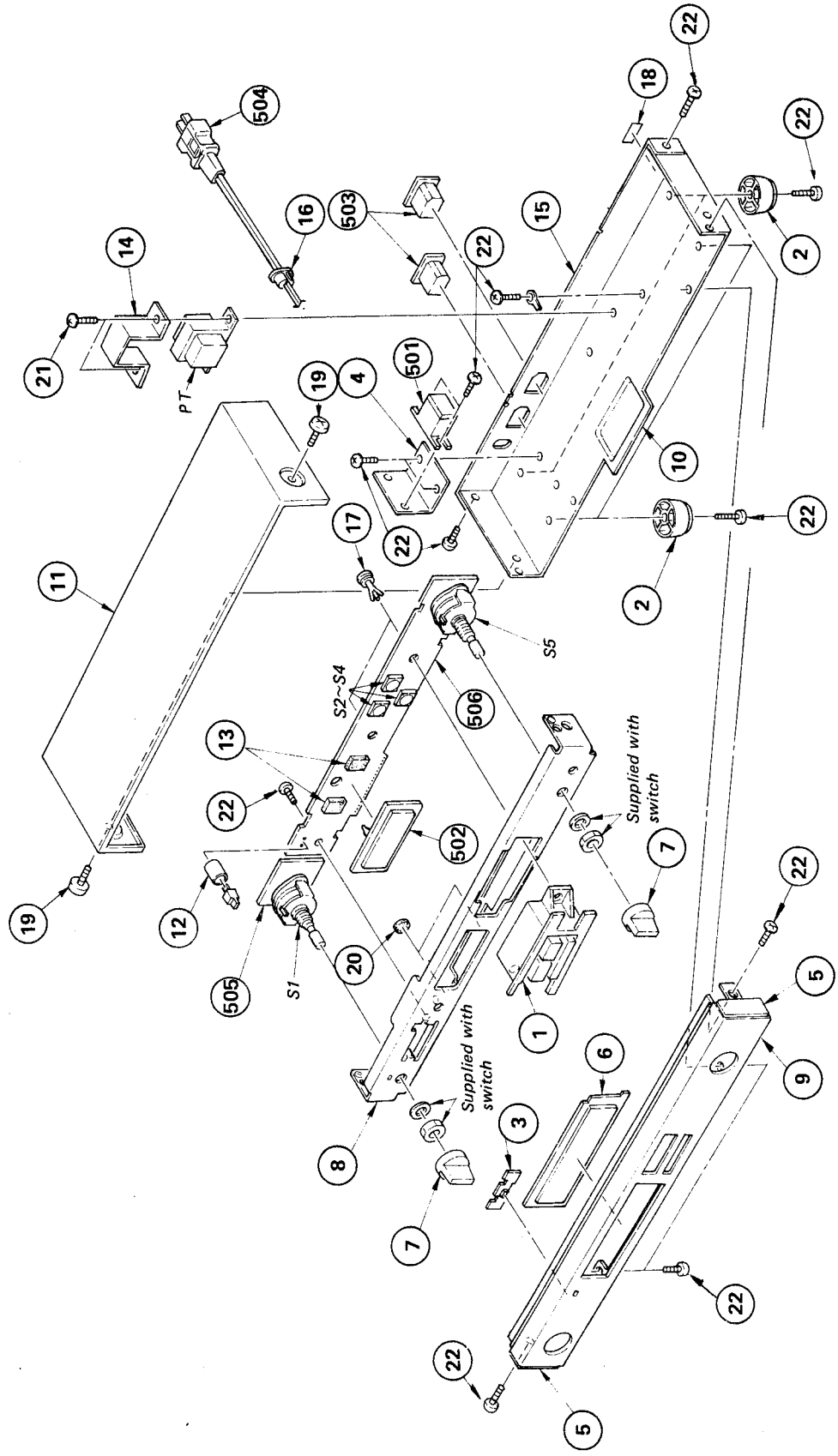
Terminal No.	Terminal Name	Terminal No.	Terminal Name
1	Timer Output	25	C_2
2	Not Used	26	b_2
3	Not Used	27	a_2, d_2
4	Timer Set	28	e_2
5	Time Set	29	g_2
6	Reset	30	f_2
7	Sleep Indication	31	Colon
8	Second Indication	32	b_3
9	On Timer Indication	33	d_3
10	Off Timer Indication	34	e_3
11	Not Used	35	b_3
12		36	a_3
		37	g_3
13	Second Reset	38	f_3
14	OSC Input 1	39	b_4, c_4
15	OSC Input 2	40	AM
16	OSC Output	41	PM
17	d_1	42	VOCS
18	c_1	43	VSS
19	VSS	44	VDD
20	e_1	45	PFC
21	b_1	46	50/60Hz Clock Input
22	a_1		
23	g_1	47	Blanking Input
24	f_1	48	

- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ : 1000Ω, MΩ : 1000kΩ
- ▭ : panel designation.
- ——: B+ bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions with a VOM (20 kΩ/V).
- Voltage variations may be noted due to normal production tolerances.
- **Switch**

Ref. No.	Switch	Position
S1	TIMER SELECT	TIMER
S2	SLOW	OFF
S3	FAST	OFF
S4	ZERO SEC	OFF
S5	FUNCTION	TIMER

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 5
EXPLODED VIEWS AND PARTS LIST



GENERAL SECTION

No.	Part No.	Description
1	X-2193-905-1	FRAME ASS'Y, KEY SWITCH
2	X-3556-910-0	FOOT ASS'Y, MF
3	2-193-908-00	COVER, LED
4	♦ 2-193-918-00	BRACKET, RELAY
5	2-193-919-00	SUPPORT, PANEL
6	2-193-920-00	COVER, INDICATOR
7	2-193-922-00	KNOB, ROTARY SWITCH
8	♦ 2-193-923-00	PANEL, SUB
9	2-193-924-00	PANEL
10	♦ 2-193-925-00	CHASSIS
11	2-193-926-00	CASE
12	♦ 2-193-939-00	HOLDER, LED
13	♦ 2-193-941-00	HOLDER, FLR
14	♦ 2-193-942-00	PLATE, SHIELD
15	2-193-949-00	PANEL, JACK
16	3-703-244-00	STOPPER, CORD
17	4-812-134-00	RIVET, NYLON
18	♦ 4-844-449-00	LABEL
19	4-847-802-00	SCREW, CASE STOPPER
20	9-911-852-XX	CUSHION, FILTER
21	7-621-255-50	SCREW +P 2X8
22	7-685-871-09	SCREW +BVTT 3X6
23	7-685-873-09	SCREW +BVTT 3X10

ACCESSORY & PACKING MATERIAL

31	2-193-933-00	CUSHION
32	2-193-950-00	CARTON
33	3-701-626-00	BAG, POLYETHYLENE
34	3-701-630-00	BAG, POLYETHYLENE
35	3-783-080-21	MANUAL INSTRUCTION

ELECTRICAL PARTS

Ref. No.	Part No.	Description
501	⚠ 1-515-430-00	RELAY
502	1-519-238-00	INDICATOR TUBE, FLUORESCENT
503	⚠ 1-526-699-00	OUTLET, AC
504	⚠ 1-551-510-00	CORD POWER
505	♦ 1-602-919-00	PC BOARD
506	♦ 1-602-920-21	COMPLETE CIRCUIT BOARD; MAIN
PT	⚠ 1-447-143-00	TRANSFORMER, POWER
S2–4	1-553-235-00	SWITCH, KEY BOARD
S1	1-553-367-00	SWITCH, ROTARY
S5	1-553-368-00	SWITCH, ROTARY

SEMICONDUCTORS

Q1, 2	8-729-663-47	TRANSISTORS 2SC1364
IC1	1-806-063-11	MB8724B
IC2	8-759-240-07	4007UBP

DIODES

D1	8-719-920-04	ERB12-04RK
D2	8-719-815-55	1S1555
D3	8-719-902-37	SLP237B
D4, 5	8-719-815-55	1S1555
BR	⚠ 8-719-510-10	S1RB10

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- Items marked " ♦ " are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH